VIDEO ARTICLE

Video images: How to insert a Bakri balloon and hold the cervix

Hirotada Suzuki, Akihide Ohkuchi, Tomoyuki Kuwata, Chikako Hirashima, Rie Usui, Shigeki Matsubara

Department of Obstetrics and Gynecology, Jichi Medical University School of Medicine, Tochigi, Japan

Introduction

The Bakri balloon is a silicone, fluid-filled tamponade balloon designed for the management of postpartum hemorrhage.\(^1\) The Bakri balloon provides effective hemostasis and a significant decrease in postpartum hysterectomy in the management of critical obstetrical hemorrhage. However, the balloon has two shortcomings. One relates to the difficulty of inserting the Bakri balloon catheter and the second to the tendency for the balloon to fall from the uterine cavity into the vaginal cavity, particularly just after vaginal delivery. In the video images provided in this report, we present a novel way to insert the Bakri Balloon, an internal examination technique, and a “holding the cervix” technique.\(^2\)

Technical note

Bakri balloon tamponade is a technique to stop hemorrhaging from the uterine cavity by pressing the uterine wall with a fluid-filled balloon. Although there are several techniques that use balloon devices for hemostasis of obstetrical uterine bleeding, the Bakri balloon incorporates blood drainage from the uterine cavity through the inflated balloon. However, shortcomings of the Bakri balloon include the technical difficulty of insertion, and the tendency for the balloon to fall from the uterine cavity into the vaginal cavity, particularly just after vaginal delivery. Here, we report a new technique for inserting the Bakri balloon catheter.

Insertion of Bakri balloon catheter: the standard technique and a novel “internal examination” technique

We first prepared the following for inserting the Bakri balloon: a Bakri Balloon set (Cook Japan, Japan), Simon’s speculum, Tsukahara Uterine Forceps, two “Tsukahara-Kanshis” (CM-5120, Atom Medical, Japan), Obstetric Holding Forceps for Suturing, two “Kei-Risu-Kanshis” (932-0202, Sanritu Medical Instruments MFG Co., Japan), two Obstetric Artery Forceps for Suturing, two “Kei-Risu-Shiketsu-Kanshis”) (932-0101, Sanritu Medical Instruments MFG Co., Japan), J.A.M.W Type Placenta Forceps (“Taiban-Kanshi”; width of 12 mm and 15 mm) (CM-5600, Atom Medical, Japan), distilled water (500 ml), iodoform gauze (2.5 m) (Tamagawa-Eizai Co., Japan), a bag for liquid waste connected to a Bakri drainage catheter, and an ultrasound device (Figure 1). The ultrasound device is used when inserting the Bakri balloon catheter into the cervix, as well as for examining the location of the Bakri balloon in the uterine cavity, the amount of remaining clots in the uterine cavity, and the presence/absence of active bleeding from the uterine wall.

The standard technique > Doctors instruct patients to spread their legs to about 90 degrees on the gynecological examination table, operating and treatment table, or medical treatment bed. The vaginal cavity is opened widely using Simon’s speculum to inspect the vaginal portion of the cervix (Video 1). The vaginal anterior portion of the cervix at the direction of 11 to 12 o’clock is held by a “Tsukahara-Kanshi”. The balloon portion of the Bakri balloon is gently held by a “Taiban-Kanshi”, and should be inserted into the cervix under ultrasound observation. One drawback of using the “Taiban-Kanshi”...
for inserting the Bakri balloon is adhesion of the “Taiban-Kanshi” to the balloon portion, resulting in the concomitant removal of the Bakri balloon when removing the “Taiban-Kanshi” from the uterine cavity. Another drawback is the technical difficulty of insertion when the uterus is strongly flexed anteriorly or posteriorly, or when the uterine cervix is strongly shifted laterally.

**Novel “internal examination technique”**
We devised a novel technique to insert the Bakri balloon and refer to it as the “internal examination technique”. This technique does not use Simon’s speculum or the “Tsukahara-Kanshi”. First, the digit and middle fingers of the non-dominant hand are inserted into the cervical canal. The balloon portion of the Bakri balloon is gently held by a “Taiban-Kanshi”, and inserted into the cervix along a gap between the fingers, under ultrasound observation by an assistant caregiver. When removing the “Taiban-Kanshi”, the Bakri balloon is held between the fingers to protect against unintentional removal of the balloon. Based on our experience, the Bakri balloon can be inserted easily, even if the uterus is strongly flexed or the cervix is strongly shifted laterally.

**Preventing the Bakri balloon from sliding out: three “holding the cervix” techniques**
The Bakri balloon catheter easily slides out of the uterine cavity, particularly just after delivery, because the cervix with cervical maturation cannot sustain the inflated balloon. Thus, we developed a technique to prevent intrauterine ballooning devices from sliding out, i.e., a “holding the cervix” technique.2) Here, we describe three “holding the cervix” techniques.

**<The standard technique>**
The vagina should be opened widely with Simon’s speculum to inspect the vaginal portion of the cervix after inserting the Bakri balloon (Video 2). Two parts of the vaginal portion of the cervix, i.e., at directions of 12 o’clock and 6 o’clock, are pinched with “Tsukahara-Kanshis”. The right deep portion of the vaginal portion of the cervix should also be pinched with a “Kei-Risu-Kanshi”. As the Bakri balloon catheter is guided to the center of the cervix, the left deep portion of the vaginal portion of the cervix should also be pinched with a “Kei-Risu-Kanshi”, resulting in placement of the Bakri balloon catheter between the two “Kei-Risu-Kanshis”. Finally, the two “Tsukahara-Kanshis” are removed. This technique has two advantages: (a) it prevents the Bakri balloon from sliding out of the uterine cavity, and (b) although not definitively determined, the occurrence of uterine contractions followed by cervical pinch due to the Ferguson reflex, which is a neuroendocrine reflex initiated by pressure on the cervix, is a well-known phenomenon during delivery.

**<The second technique>**
Two parts of the vaginal portion of the cervix, at directions of 1 to 2 o’clock and 4 to 5 o’clock, are held by “Tsukahara-Kanshis”. While the Bakri balloon catheter is being shifted to the direction of 9 o’clock, the right deep portion of the vaginal portion of the cervix is pinched with a “Kei-Risu-Kanshi”. This is followed by removal of the two “Tsukahara-Kanshis”. Next, two parts of the vaginal portion of the cervix, in directions of 10 to 11 o’clock and 7 to 8 o’clock, are held by “Tsukahara-Kanshis”. While the Bakri balloon catheter is being shifted to the direction of 3 o’clock, the left deep portion of the vaginal portion of the cervix is pinched with a “Kei-Risu-Kanshi”, resulting in placement of the Bakri balloon catheter between the two “Kei-Risu-Kanshis”. Finally, the two “Tsukahara-Kanshis” are removed.

**<The third technique>**
Two parts of the vaginal portion of the cervix, at directions of 1 to 2 o’clock and 4 to 5 o’clock, are held by “Kei-Risu-Kanshis”. While the Bakri balloon catheter is being shifted to the direction of 9 o’clock, the right deep portion of the vaginal portion of the cervix is pinched with a “Kei-Risu-Shiketsu-Kanshi”. After removing the “Kei-Risu-Kanshi” in the direction of 4 to 5 o’clock, while gently pulling the “Kei-Risu-Kanshi” in the direction of 1 to 2 o’clock, the left-middle deep vaginal portion of the cervix is pinched with the removed “Kei-Risu-Kanshi”, resulting in placement of the Bakri balloon catheter at the left corner of the cervix. This is followed by removal of the “Kei-Risu-Kanshi” in the direction of 1 to 2 o’clock.

**Injection of distilled water into the Bakri balloon**
After inserting the Bakri balloon into the uterine cavity

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**Figure 1.** Equipment required for inserting the Bakri balloon. (a) Simon’s speculum. (b) J.A.M.W Type Placenta Forceps (12 mm wide). (c) Distilled water (500 ml). (d) Iodoform gauze. (e) Tsukahara Uterine Forceps (“Tsukahara-Kanshi”). (f) Obstetric Holding Forceps for Suturing (“Kei-Risu-Kanshi”). (g) Obstetric Artery Forceps for Suturing (“Kei-Risu-Shiketsu-Kanshi”).
and performing the “holding the cervix” technique, distilled water is injected into the Bakri balloon. The expansion of the balloon should be monitored under B-mode ultrasound to ensure it does not slide out of the uterine cavity and into the vagina. In addition, Doppler-mode ultrasound (color flow mapping) should be used to monitor whether bleeding from the uterine wall is attenuated by pressure from the Bakri balloon. We recommend stopping the injection of water after confirming cessation of bleeding from the Bakri drain, and follow this with the addition of 50 ml of distilled water after cessation of bleeding. In most cases, 200 to 300 ml of water will be necessary. After finishing the injection, iodoform gauze should be packed into the vaginal space to compress the external cervical os, and 1.5 m and 1.0 m of iodoform gauze placed at the posterior fornix and anterior portion, respectively.

Based on our experience, the “holding the cervix” technique does not prevent smooth water injection. In other words, “holding the cervix” does not close the cervix to an extent that distilled water cannot pass through. If some resistance is encountered when injecting water, the forceps for “holding the cervix” likely should be loosened during insufflation (injection), although we have yet to experience this situation.

**Timing for removing the Bakri balloon**

We typically remove the Bakri balloon 12 to 24 h after insertion. When removing the catheter, we always monitor uterine bleeding by ultrasound, in addition to speculum examination.

**Discussion**

Here, we present a novel method for inserting the Bakri balloon, an internal examination technique, and a “holding the cervix” technique.2) There are several drawbacks to these techniques. First, they require a caregiver (nurse or doctor). Therefore, when deciding to insert a Bakri balloon, appropriate support should be in place. Second, when performing the “holding the cervix” technique, pulling the “Tsukahara-Kanshi” too strongly can result in it sliding and causing considerable bleeding. Third, in some cases of atonic bleeding, the Bakri balloon cannot stop the bleeding. If the Bakri balloon method fails, other methods should be used to stop the bleeding, such as interventional radiology, uterine compression sutures, or hysterectomy.

In this report, we focused on vaginal insertion of the Bakri balloon (vaginal route). During cesarean section, we usually use “abdominal insertion (abdominal route)” in conjunction with “holding the cervix”. In this situation, the vaginal side of the balloon is connected to a Nelaton transurethral rubber catheter (Nelaton method (Matsubara)) to facilitate smooth passage of the balloon through the cervical canal,3) and the balloon shaft is lifted by a thread (fishing method [Matsubara]).4) When “holding the cervix” is difficult or time consuming, we usually use the abdominal traction stitch (Matsubara) method to prevent balloon prolapse.4,5) All these procedures have been described previously.3–5)

In conclusion, the internal examination technique described here is useful for prompt insertion of the Bakri balloon, and the “holding the cervix” technique helps ensure the Bakri balloon does not slide out. Mastering these techniques will likely increase the success rate of stopping atonic bleeding.

**Conflict of interest**

The authors have no conflict of interest to declare.

**References**


**Video 1.** Insertion of the Bakri balloon catheter: the standard technique and internal examination technique.

**Video 2.** Preventing the Bakri balloon from sliding out: three “holding the cervix” techniques.

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